Enterprise Systems Services Centers (ESSC)
Concept Document

Introduction

The State of Montana and Montana citizens are heavily dependent on computer systems, network facilities, and voice telecommunications facilities managed by the Department of Administration (DOA), Information Technology Services Division (ITSD). These facilities are currently housed in the basement of the Mitchell Building in Helena.

The Mitchell Building basement is unsatisfactory for housing this critical infrastructure for the following reasons:

- The building is old and at risk for seismic damage in the event of a significant earthquake.

- The east wing of the Mitchell Building, which houses the computer center in the basement, is poorly engineered

- Water pipes and communications and power cables are positioned side-by-side, making them vulnerable to any leak.

- Millions of dollars of sensitive electronic equipment is vulnerable to water collecting in the lowest portions of the building.

- The Mitchell Building was not designed with considerations for providing physical security. There are 14 exterior entrances to the building.

- The State is increasingly at risk of failing to meet federal HIPAA, IRS and Justice data sharing requirements because of shortcomings of the building, particularly those related to security.

- Since the Department of Revenue and other divisions of the Department of Administration also occupy the building public access is required. This requirement complicates security measures.

Members of the Legislative Audit Committee, Governor Brian Schweitzer, Chief of Staff Bruce Nelson, and Budget Director David Ewer have toured the data center and have expressed concerns about the current facilities and the need for secure, efficient facilities.

The Department is proposing to construct two facilities:

1. A new ESSC building in Helena to house ITSD staff and the primary Systems Services Center.

2. A remote ESSC facility in the eastern portion of Montana to provide operational capacity, redundant facilities to support critical services, accelerated back up processes and enhanced disaster recovery capabilities.

Goals of the ESSC Proposal

The ESSC proposal has four goals:

1. To provide security that protects Montana data, hardware, and software to the level of industry best practices and the requirements established by Federal agency partners.

2. To provide "non-stop" operation of critical applications through redundant services centers, redundant computers, and replicated data.

3. To accommodate the data center computing facility needs of other agencies quickly and with minimal cost.

4. To maximize the State's benefit from its disaster recovery investments.

Business Goals

The ESSC goals support the following key business goals:

ESSC GOAL	BUSINESS GOALS			
	Continuity of Government	Improved Services	Security	Efficiency of Government Services
Security: Assure that critical state IT infrastructure is housed in facilities that minimize the risk posed by natural disaster or human threat.	Yes		Yes	
"Non-stop" services: Provide redundancy to minimize the effects of both planned and unplanned outages on ITSD services.	Yes	Yes	Yes	Yes
Cost efficiency: Provide capacity for ITSD growth and co-location of agency IT operations into shared facilities.	Yes	Yes	Yes	Yes
Disaster Recovery: Derive maximum benefit from funds currently spent on out-of-state "cold site"[1] disaster recovery services.	Yes			Yes

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[1] *Cold site* refers to a facility that is available to the State for disaster recovery purposes with hardware capable of supporting critical State processing. All application systems and data must be restored at the

Helena Enterprise Systems Services Center

The Helena ESSC will provide the following facilities:

- A technical facility housing:
    - Enterprise Data Center
    - Network Operations Center
    - Voice Telecommunications Operations Center
- Office facilities for ITSD staff and any technical staff from other agencies that want to be located with any hardware hosted in the computer center.

The facilities will be connected to the Capitol Complex metropolitan area network.

Technical Facility Characteristics:

Following is a list of key characteristics of the facility housing the Enterprise Data Center, Network Operations Center, and the Voice Telecommunications Operations Center.

Physical capacity

- 10-12,000 square feet of raised floor equipment space to accommodate ITSD equipment, including volume-printing equipment.

- Modular expansion capability to accommodate ITSD growth and housing of other agencies' equipment at minimal cost.

- Redundant emergency electrical generators will be provided for all electrical needs. This includes power monitoring and automated transfer features.

- Appropriate fire suppression capability, such as FM200[2], will be installed to protect all electronic equipment. There will be no water sprinkler fire suppression in areas designed to house electrical equipment.

Safety and Security

- The Technical Facility will be a single story building engineered to standards established for seismic zone 4.

- There will be a single, controlled access point with cardkey electronic access and staff-monitored access during normal business hours. Video monitoring will be considered as well.

- There will be no external signage identifying the building as a technical center.

- There will be a minimal number of windows in the facility.

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cold site from back-up files routinely created at the normal processing site. Restoration takes two to three days under exercise conditions. ITSD has a contract with SunGard Recovery Services for cold site services.

[2] *FM200* is the fire suppressant agent used in areas that contain electronic equipment. It is more effective and less environmentally damaging than its predecessor agent, HALON.

- Site selection will minimize the risks posed by adjacent infrastructure and development. Examples include risks posed by rail lines, major highways, and petroleum refining and storage facilities.

- Landscaping and topographical features will be used to keep vehicles and pedestrian traffic well away from the building. Employee parking will be positioned away from the technical facility.

Office Facility Characteristics

- Facilities for approximately 300 staff.

- The Office Facility will be connected to the Technical Facility by a shared reception area.

- Cardkey access and staff monitoring during normal business hours will secure the Office Facility.

- The reception area will include several meeting rooms, with video conferencing capability, to minimize the number of visitors requiring access to controlled areas.

- One or more meeting rooms will be configured to serve as an "emergency operations center" in the event of an emergency affecting IT services.

- An auditorium facility accommodating up to 150 people will be included, with video and projection services.

- An open office design will be used to use modular furniture, workspaces and offices, including all supervisor and manager offices. Numerous small meeting rooms will be included in office areas to promote collaboration.

- Office facilities will be spacious and attractive to contribute to employee satisfaction and to aid in the recruitment and retention of quality employees.

Critical Nature of the Office Facility

Decision-makers need to understand the critical nature of the office facility. There is tremendous potential benefit to the state if servers, other equipment and staff from many agencies can be co-located in the Helena ESSC. These benefits include efficient use of staff, improved operations for agencies, space "recovery", and other benefits. There is the potential to provide expanded services to local units of government with additional benefits to Montana citizens.

However, many technical jobs in IT are most efficiently performed by the employee in close proximity to the equipment upon which he/she works. It is imperative that adequate space be provided adjacent to the Technical Facility to house those technical workers. Providing that space will avoid a serious obstacle to centralization[3] of agencies' computing environments.

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[3] *Centralization* refers to agencies co-locating their computing environments in a shared facility. Agencies receive the benefit of state-of-the-art facilities providing security, protection from natural or manmade disaster, additional services, such as backup, and 7X24 professional operations staff. In a centralized approach the agency retains ownership and control of the IT equipment.

Location Connectivity Considerations

The new facility is likely to be located away from the Capitol Complex on existing state-owned land, probably in the vicinity of the MDT office complex. This will require extending the metropolitan area network, or Capitol Complex Backbone network, to the new building by installing buried conduit housing fiber optic cable. Dual paths will be required to provide redundancy. We estimate this will cost $500,000.

Potential Capitol Complex Presence

It may be sensible to retain space in the Capitol Complex for the following purposes:

- An office for the CIO in view of his/her interactions with decision-makers housed in the Capitol Complex.

- Retain "office hotel"[4] space at the Capitol Complex to ensure productivity of ITSD staff members that frequently meet with agency customers and for special situations, such as the Legislative Session.

- Retain a printing facility to allow ready distribution of volume print to agencies if distribution capabilities of the capitol mail service are not satisfactory.

Further analysis of these needs will determine whether or not space in the Capitol Complex is needed.

Remote ESSC

The remote ESSC will provide the following facilities:

- Enterprise Data Center

- Backup Network Operations Center

- Backup Voice Telecommunications Operations Center

- Office facilities for ITSD staff and any technical staff from other agencies that host their hardware in the data center that desire to co-locate with their equipment.

The facility will be connected to the statewide SummitNet wide area network. The remote ESSC will provide additional production processing capacity to work in concert with the Helena facility. The two facilities also will provide "hot site"[5] backup for each

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Benefits to the State include positioning key systems in a high quality environment, reduction in total staff required for operations across involved agencies and the freeing of space currently used for housing hardware in those agencies.

[4] *Office hotel* refers to providing office facilities in a location that can be used by a variety of workers on an as-needed basis, rather than on an assigned basis. In this way a limited amount of office facilities can support the occasional needs of a number of people.

[5] *Hot site* refers to a facility that is continually kept current ("mirrored") with production State applications and data at the primary processing site. Two sites can mirror each other and share the normal processing load as the primary site for the critical applications. In the event of a processing interruption at a primary site, its critical applications can continue processing by switching to the hot site with little or no disruption in service.

other by replicating critical application data to the other site. In the event of a service interruption at one site, the other site will pick up the processing load for critical applications with virtually no interruption in service. Non-critical applications may be unavailable or experience lower levels of performance during these situations.

This facility, located in eastern Montana, will provide a number of infrastructure services, such as telecommunications, for eastern portions of the state. During normal operations this facility will provide the eastern Montana users with the best possible systems performance and response.

Remote ESSC Characteristics

The facility will have similar characteristics to the Helena facility with the exceptions of size and limited office space, which will be in a single building with the technical facility.

Initial size of the remote facility is estimated to be 5,000 square feet. The design will allow for modular expansion at the lowest possible cost. All safety and security features will be consistent with the Helena facility with two exceptions:

1. Seismic engineering will be determined by the location selected for the facility. We expect that it will be in a less seismically active area and the cost of the building will be reduced as a result.

2. There will not be a need for reception monitoring of access. All access will be based on cardkey devices and a second authenticating factor, such as a biometric characteristic[6] or a fob[7].

Hardware and Communications Investments Required

The ESSC plan requires investments in both computing and data storage equipment, and in high-speed communications between the two centers to achieve the goal of non-stop service for critical applications.

Computing and Data Storage

The computing and data storage equipment investment will be primarily in data storage devices with a modest amount of peak load server capacity also expected. The hardware will allow critical application data to be replicated in both sites to assure virtually non-stop processing by critical applications in the event their primary processing site is interrupted by either a planned (such as preventative maintenance) or unplanned outage (such as an equipment failure). We estimate $500-750,000 for this equipment at each site. However, the actual investment will depend directly on the amount of data in applications deemed to be "critical".

Management Control Software

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[6] *Biometric characteristics* are unique physical characteristics of an individual that can be used for identification purposes for security. Examples include thumbprints and retinal scans.

[7] A *fob* is a small device assigned to an individual, as a complement to a user-id and password, to assist in ensuring that the individual is who he/she purports to be. For example, an employee may be required to enter user-id/password **and** place their fob in a special reader to gain access to a controlled area. This is often referred to as two-factor authorization.

Operating multiple sites, especially where "hot" backup of each other is involved, requires that investments in management control software tools to minimize the need for additional staff. Remote server and storage management, backup software, remote network monitoring and management, and scheduling software are representative of these tools. We estimate the cost of these software licenses to be $250,000 with $50,000 annual support and maintenance charges.

Communication Links

Real-time data replication and disk-to-disk backups over the network will require high bandwidth communications capabilities. While this technology is constantly changing and the price-performance is continually improving, costs for a high-speed link would be expected to be approximately $15,000/month for redundant, high capacity, optical fiber connections. These are recurring operational costs, not one-time construction costs.

Estimated Cost Summary

	Estimated Initial Cost	**Estimated Recurring Cost**
Land Acquisition	$250,000 (Helena site expected at no cost)	N/A
Helena Systems Services Center	$14,100,000 (0ffice) $3,000,000 (Technical Center)	N/A
Helena Site Preparation & Parking	$1,750,000	
Helena Capitol Complex Network Extension	$500,000	N/A
Eastern Montana "Hot Site" Systems Services Center	$2,000,000	$180,000/year (high-speed comm. link)
Computing & Storage Equipment for High Availability	$1,500,000	$300,000/year (hardware maintenance)
Systems & Site Management Software	$250,000	$50,000/year (software maintenance)
Moving Cost	$300,000	
Additional Furnishings Provision	$500,000	
Total One-time Cost	$24,150,000	$530,000/year

Enterprise Systems Services Centers Concept

Avoided ITSD Space Costs:

By moving all ITSD staff and operations to the new building, the costs associated with their present housing would be avoided. The following table includes ITSD space costs based on January 2006 actual costs.

	Weinstein	M&M *	ITSD- Mitchell	Annex	Old Livestock	SABHRS	TOTAL
Per Month	$ 3,862.50	$ 5,382.10	$ 27,608.00	$ 852.00	$ 606.00	$ 2,934.00	$ 41,244.60
Annual	$46,350.00	$64,585.20	$ 331,296.00	$10,224.00	$ 7,272.00	$35,208.00	$494,935.20

* - This is a five year lease through Jan 2010

NOTE:

Figures are based on January 2006 amounts.

Amounts do not include storage.

Amounts do not include training center.

Any other agency that uses the new facility to house equipment and staff will also avoid space costs associated with their current physical location. ITSD will charge hosted agencies for space occupied in the new facility through appropriate rate structures. The resulting revenue from agencies plus the avoided ITSD space costs, above, are important parts of the financial consideration of this proposal.

Avoided Disaster Recovery Vendor Costs/Improved D/R Performance:

One of our business objectives is to "derive maximum benefit from funds currently spent on out-of-state "cold site"[8] disaster recovery services." ITSD currently has a contract with SunGard Recovery Services to provide ITSD staff with a physical location and specified hardware to allow the ITSD to recover and provide services in the event of a disaster. Our primary SunGard site is near Philadelphia, Pennsylvania. The current annual cost of that contract is approximately $350,000, and it is increasing as we add and expand services. ITSD conducts two disaster recovery drills annually at the SunGard site costing an additional $50-100,000 annually.

Our relationship with SunGard can be thought of as an "insurance policy"; only in the event of a disaster will we receive any direct benefit. By contrast, our approach of dual sites that back each other up, and which can almost instantly take over critical processing in the event of an outage at one site, dramatically changes our disaster recovery capability. The two to three days required to physically move back up files and key staff

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[8] *Cold site* refers to a facility that is available to the State for disaster recovery purposes with hardware capable of supporting critical State processing. All application systems and data must be restored at the cold site from back-up files routinely created at the normal processing site. Restoration takes two to three days under exercise conditions. ITSD has a contract with SunGard Recovery Services for cold site services.

across the country to the SunGard site and begin to restore services is eliminated. Instead, critical services are continuously available. This is crucial for public safety and services to citizens dependent on the State for their most basic needs. The nearly $450,000 presently flowing out-of-state will help provide these critical services in-state, without interruption.

Project Timeline Examples

Traditional Approach Construction of the Systems Services Centers

Moving ITSD services and staff out of the Mitchell Building is the foremost priority. To permit ITSD to occupy the new Helena facility as quickly as possible, ITSD and the Architecture and Engineering (A&E) Division can conduct conceptual design activities prior to full project approval by the 2007 Legislative session. This will allow detailed design and bid-letting to move forward immediately upon passage of bonding authority. A&E advises that under this scenario, the new Helena facility would likely be ready for occupancy during the winter 2009-2010.

Due to smaller size and lesser complexity of the remote facility, it's likely that it could be ready for occupancy earlier than the Helena ESSC. To minimize problems during the shakedown period of the Helena ESSC, we will likely move the equipment currently housed in the existing Billings site to the remote ESSC prior to occupying the new Helena site.

Attachment A contains a representative project timeline for this approach.

Non-Traditional, Accelerated Construction Approach

To realize the benefits of the new Systems Services Centers earlier than the traditional approach allows, a non-traditional approach can be used. There are two major aspects of this approach to consider:

1. There needs to be a sub-project for each of the facilities:
   a. Eastern Montana "hot site" technical facility.
   b. Helena technical facility.
   c. Helena office facility
2. All sub-projects would have only conceptual design performed prior to Legislative approval.

This approach would allow ITSD to occupy the eastern Montana site in mid-to-late 2008. The Helena technical facility would come online around year-end 2008 and the office facility in late 2009. An additional benefit of this approach is that the office requirements would be included in the Helena general space requirements plan being developed by A&E.

Attachments B1 and B2 contain representative project timelines for this approach.

Leased Facilities Approach

To further accelerate the project requires the used of a leased facilities approach. In this approach a private sector company would construct facilities to our specifications. The state will enter into a long-term lease with the builder.

There are a number of very important considerations:

- This approach does not require project approval and funding by the Legislature. This removes significant time from the design and construction cycle. However, it may cause significant concern for legislators who feel we have evaded their authority to approve building projects.

- There may be concern that long-term lease constitutes debt, which requires legislative approval.

- Constructing private sector-owned buildings on state land.

This approach, if allowed, might reduce the time-to-occupancy by as much as two years for some sub-projects compared to the traditional approach. This approach may allow ITSD to occupy the eastern Montana site in early-to-mid 2008, the Helena technical facility in mid-2008, and the office facility in early 2009.

We are presently exploring this approach further, including the experience of other government entities with similar projects.

Attachment C contains a representative project timeline for this approach.